

The Online Terminology Forum for East Cree and Innu: A collaborative approach to multi-format terminology development

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For Indigenous languages to thrive, it is essential for speakers to be able to talk about their present reality in relevant and meaningful ways. In this paper, we report on our work in terminology development through workshops and the creation and use of modern digital tools including online dictionaries and terminology forums, and by working with speakers in the creation and ongoing discussion of new words. We describe the technology required to make this possible and the necessity of producing various formats, such as interactive images, booklets, and multimedia apps. We discuss the tools we have developed with and for East Cree and Innu speakers, translators, and linguists and the challenges of quality terminology creation, including context, clarity, dialectal variation, multiple submissions, and the specificity of the structure of Algonquian languages. We explain how videos can complement and support terminology development and diffusion and the importance of providing searchable, translated texts for models and context. We stress the importance of allowing oral, visual, and written submissions to interactive terminology databases. We also report on two Online Terminology Forum training workshops with Innu translators. We demonstrate the advantages of building a pan-Algonquian terminology database to combine, strengthen, and expand communities' (re)vitalization efforts across thematic domains such as health, justice, environment, education, and technology.

1. INTRODUCTION. For Indigenous languages to thrive, it is essential for speakers to be able to talk about their present reality in relevant and meaningful ways. In this paper, we report on our work in terminology development through workshops and the creation and use of modern digital tools, including online dictionaries and a terminology forum, and by involving speakers in the creation and ongoing discussion of new words. After situating the social and linguistic context of our terminology work, we describe the technology developed and the necessity of producing various formats, such as interactive images, booklets, and multimedia apps. We then discuss the tools we have developed with and for Innu and East Cree speakers, translators, and linguists, illustrating two domains: legal and medical terminology. We discuss the challenges of quality terminology creation, including context, clarity, dialectal variation, multiple submissions, and the specificity of the structure of Algonquian languages. We then illustrate the use of the Online Terminology Forum (terminology.atlas-ling.ca) in workshop settings. We demonstrate the advantages of building a pan-Algonquian terminology database to combine, strengthen, and expand communities' (re)vitalization efforts across thematic domains such as health, justice, environment, education, and technology.

1.1 EAST CREE AND INNU. East Cree is spoken by approximately 18,000 people¹ across the large territory of Eeyou Istchee Baie-James (Eastern James Bay, Quebec) and comprises 11 communities. The language is divided into two dialects, Northern and Southern, and the Southern dialect is further divided into two sub-dialects: Coastal and Inland. Innu-aimun (commonly called Innu and formerly known as Montagnais) is spoken by over 11,000 Innu in 12 communities in coastal Quebec and Labrador.² There are three dialects spoken in Quebec (Eastern, Central, Western) and two in Labrador (Sheshatshiu and Mushuau).

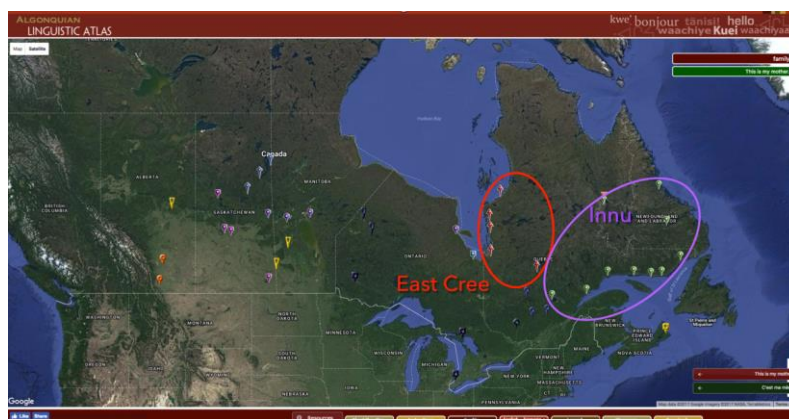


FIGURE 1: Location of East Cree and Innu communities - www.atlas-ling.ca

Both East Cree and Innu are Algonquian languages and part of the Cree-Innu dialect continuum (MacKenzie 1980) that ranges from Labrador to the Rocky Mountains in Canada (see Fig.1). Communities are often hundreds of kilometers apart, some with road access, without, and it is often logistically difficult, time-consuming, and expensive to arrange for speakers to meet in person to work on terminology development.

¹ This is the number of East Cree or “Eeyouch” given in the Cree Nation Government website (<https://www.cngov.ca/community-culture/communities>) most of whom speak their language.

² The number of Innu speakers given by Statistics Canada in the 2016 Census was 11,360.

1.2 ALGONQUIAN LANGUAGE FAMILY. East Cree, Innu, and other languages in the Algonquian language family share a similar structure. They are verb-based, polysynthetic languages and share many grammatical features in common, which means that they have the same ‘building blocks’ when it comes to terminology development. For example, body part terms can appear as incorporated morphemes, as in (1), as dependent nouns that always require a personal prefix, as in (2), or as ‘finals’ of action verbs, as in (3).

(1) Body parts as incorporated morphemes:

nâtwâpituneshin (East Cree)
 nâtwâ-pitun-eshin
 break-arm-horizontal.movement
 ‘s/he has a broken arm from falling’

natuapituneshinu (Innu)
 natua-pitun-eshinu
 break-arm-horizontal.movement
 ‘s/he has a broken arm from falling’

(2) Body parts as dependent nouns:

<i>uspitun</i> (East Cree)	<i>chispitun</i> (East Cree)	<i>mispitun</i> (East Cree)
u-spitun	chi-spitun	mi-spitun
her/his-arm	your-arm	someone’s-arm
‘her/his arm’	‘your arm’	‘an arm’
<i>ushpitun</i> (Innu)	<i>tshishpitun</i> (Innu)	<i>mishpitun</i> (Innu)
u-shpitun	tshi-shpitun	mi-shpitun
her/his-arm	your-arm	someone’s-arm
‘her/his arm’	‘your arm’	‘an arm’

(3) Body parts as verb finals:

îchânim (East Cree)
 îchâ-nim
 move.aside-by.hand
 ‘s/he nudges it aside’

itshenam^u (Innu)
 itshe-nam^u
 move.away-by.hand
 ‘s/he moves it away (by hand)’

From a cultural perspective, speakers of East Cree, Innu, and related languages often share a similar worldview, cultural values, and conceptualization process. These structural and cultural similarities allow for rich, cross-linguistic collaboration, mutual inspiration, and sharing of resources between communities in the wider language family.

1.3 ALGONQUIAN DICTIONARIES PROJECT. The Algonquian Dictionaries Project (resources.atlas-ling.ca) currently includes 12 participating dictionaries, including the East Cree Dictionary (dictionary.eastcree.org) and Pan-Innu Dictionary (dictionary.innu-aimun.ca). The East Cree Dictionary has been online since 2004. The Pan-Innu Dictionary was first published online in 2011 and has been updated annually ever since. Print versions of both dictionaries are available and the Pan-Innu Dictionary is also available as a mobile app.³ For these two online dictionaries, speakers with access can submit commentaries to suggest new words, new definitions, corrections, and so on. These comments are later reviewed by an editorial committee and updates to the dictionaries are made accordingly.

1.4 TERMINOLOGY DEVELOPMENT IN EAST CREE AND INNU. Terminology development as a standardizing practice for Algonquian languages has been happening for several decades to respond to communities' changing communication needs. Some early examples in the medical domain include: Preparing a Medical Glossary (Wolfart & Ahenakew 1987) for Plains Cree; *Lexique montagnais de la santé* (Drapeau 1990) for Innu; Cree Health Lexicon (Council of the Mistissini Band 1991) for East Cree; and English-Cree Medical Glossary (MacKenzie, Spence, & Hall 1997) for Eastern Swampy Cree.

Some best practices have emerged since the early days, such as collaboration between different entities and sharing of resources. Good terminology development in specific domains involves a collaboration between language specialists who are fluent speakers, linguists, and experts in the relevant field who can explain in plain language the concepts considered. It also requires experience in the domain from an Indigenous person's perspective, whether it be going through the medical system and justice systems or working in a mine. Challenges are numerous: for many communities, there are very few fluent speakers with mastery of standard orthography (if a standard orthography even exists for the language) or with training in word formation and morphology for terminology development. Even where such people do exist, they seldom have experience in the domain considered. When a language is thriving, neologisms are created naturally. However, they often remain confined to a small circle or a specific community's oral language, without having a chance to be disseminated to others who might need them. Experts in a specific domain, when mandated by government agencies for terminology development, often lack awareness of cultural and linguistic differences.

One solution, explored in both the Innu Language Project (directed by MacKenzie) and the eastcree.org project (directed by Junker),⁴ has been to combine linguistic training of speakers and translators with cultural awareness training of non-Indigenous domain experts. Using this method, specialized vocabularies have been created with the Innu from Labrador in the fields of health, justice, environment, and education and with the East Cree in the fields of health and justice.

Sharing of resources is an important dimension of successful terminology development. For the Innu Medical Glossary (MacKenzie et al. 2014), the Innu Language Project received permission from the hospital in Sioux Lookout, Ontario, to use the list and diagrams from their medical glossary. We also received permission to use the English terms and definitions from the Inuit glossary, Tukittangit kiansait uKausittangita &

³ The Innu Dictionary app for iOS devices was updated in December 2018 and is available on iTunes. An older version of the app for Android is available on Google Play.

⁴ See Junker (dir.) 2000-present: www.eastcree.org

taijaugusingit timimmiutait – Cancer Terminology & Body Part Diagrams, for our recent Labrador Innu Cancer Care and Body Part Terminology book (MacKenzie et al. 2017a, 2017b). When the Cree Health Board launched its East Cree cancer terminology project with us at eastcree.org, we had access to the work done for the Innu dialects in Labrador, a related language. Thus, much of the terminology that exists for Innu and East Cree is the result of a history of shared resources and mutual inspiration between the various dialects of the languages.

1.5 MULTI-FORMAT RESOURCES. Through our work in terminology development for Innu and East Cree, we have learned that there continues to be a need for multi-format resources. Due to factors including the remoteness of communities, varying degrees of access to the internet, and differences in age and technological literacy among speakers, it is important that we make our resources available to speakers in a wide range of formats, both online and offline, including books, apps, websites, and online forums.

For situations when internet access is unreliable or even non-existent (commonly the case in remote communities) or when access is restricted (for example, in the courtroom, in hospitals) resources in the form of books or mobile apps are essential tools for interpreters and translators. We have found that glossary apps have become a particularly useful offline format for interpreters and translators since they are portable and can include audio recordings and interactive images. The *Innu Medical Lexicon* app, for example, includes over 1200 medical entries in the Labrador dialects of Innu, and has over 1500 accompanying sound files as well as 32 labeled diagrams of body parts and systems.⁵

When access to the internet is readily available, online resources offer exciting opportunities for collaborative vocabulary development even when translators are not able to meet in person. Working in groups is ideal, but funding does not always allow for this type of collaboration. For these situations, the *Online Terminology Forum* offers the opportunity of building on the work of collaborative terminology development between dialects and related languages across large distances. From their individual communities, translators can review and question existing terms, suggest corrections or improvements, add new propositions and recordings, and offer additional information, including example sentences, context, dialect information, and so on.

1.6 HISTORY OF THE ONLINE TERMINOLOGY FORUM. Languages are living entities that grow and change as people use new words and stop using older ones. This is one of the reasons that print dictionaries and other books become outdated. In 2003, in order to allow and encourage an active process of creating and disseminating neologisms across the Cree dialectal continuum, Junker created an online discussion forum and e-mail list, guided by a Participatory Action Research (PAR) model (Junker 2018).⁶

In its first incarnation, the PAR model included many people who now participate in the Algonquian Dictionaries Project and Algonquian Linguistic Atlas, from Plains Cree to East Cree.⁷ However, as is often the case with unmoderated public forums, some inappropriate use of the *Forum* occurred, so eventually we decided to shut

⁵ The Innu Medical Lexicon app is available as a free download from iTunes or Google Play.

⁶ In PAR, the process of the research matters as much as the goals. PAR seeks to understand the world by changing it (Chevalier & Buckles 2013a, 2013b).

⁷ See Junker (dir.). 2005-present: www.atlas-ling.ca

it down and to create a new version to focus on the two dialects of East Cree with a multilingual platform that included French. This time we added a database to the e-mail list, a moderator, and, following recommendations from our language partners from the Indigenous organizations we work with, screening of subscribers within the east-cree.org project. This became the first version of the *Online Terminology Forum* for East Cree. It included the results of our terminology workshops as well as occasional ongoing contributions.

Only much more recently, however, have funding and technology made collaborative terminology development with online tools really possible. Funding from the Cree Health Board (based in Quebec) allowed us to reprogram and update the Forum in 2016-17 and make it accessible to all interested language groups. The sharing of terminology development work described above, together with our established history for collaborative dictionary development,⁸ led naturally to an expansion of the technological resources beyond East Cree. The funding and sharing of resources resulted in an updated and expanded version of what is now the *Algonquian Terminology Forum*.

Unlike our main Innu, East Cree, and Atikamekw dictionaries,⁹ where it is only possible to access a term for one language or dialect at a time, in the Forum all terms (including those for different languages and dialects) are presented in the same place in order to facilitate the editing process. Speakers of a particular language or dialect can easily review how speakers from related dialects and languages have translated a term, and can use these terms as inspiration for adapting or creating new terms in their own dialect. This type of collaboration is also a way to continually strengthen the quality and precision of existing terms as speakers can review terms and suggest corrections and improvements.

To date, the Forum comprises 6,694 terms in domains including grammar, environment, justice, health, sports, technology, education, and more, with translations into East Cree, Innu, and, most recently, Atikamekw as well. In the following sections, after we present the technology behind the current Forum, we discuss in more detail how the Forum is being used for terminology development and diffusion and we examine two projects/languages that have contributed to the development of the Forum and made extensive use of this tool.

2. BUILDING THE TERMINOLOGY FORUM PLATFORM. In order to build the Online Terminology Forum platform, we needed to define our core requirements. We chose a centralized database approach, i.e., one master database to hold the latest version of the data, thereby eliminating synchronization issues. We also needed the platform to accommodate multiple users, where each user would be given a predetermined degree of control over the data. Finally, we needed the platform to accommodate ‘live data’, where a contributor would always be able to access the latest submitted (and approved) term. To guide our technical choices in the design process of the platform, we needed to answer questions about the users’ skills, access, literacy, and so on. These questions included:

- What computer skills will the contributors have?
- What devices will they have access to?
- What level of literacy will they have?

⁸ See dictionaries.atlas-ling.ca.

⁹ In addition to our three main dictionaries, work is moving forward on 9 additional Algonquian dictionaries, see dictionaries.atlas-ling.ca.

- Will they be able to read the standard orthography?
- Will they understand specialized terms?
- When, where, and how will they be accessing the *Forum*?
- Will contributors work in a room together or from their respective communities?

Since our hope was that we would be able to foster strong engagement with the platform as well as avoid duplicate terminology creation, the platform had to be engineered in order to allow the import of large volumes of data from other sources and in diverse formats.

2.1 TECHNOLOGY. The architecture of the web end of the platform is optimized to reduce traffic between the browser and the server. The data is loaded in small chunks with the client's browser doing most of the heavy work of displaying the data. This allows the server to accommodate multiple users without being bogged down by traffic and to be accessible in remote areas with high latency internet.

The technology we use for the *Forum* is open source. We host via a shared service platform and scripting and data conversion (for import) is done with Python and Visual Basic. The *Forum* was built as part of a SSHRC-funded project at Carleton University by hired programmers. It is maintained by the current project but with additional funding from participating Indigenous organizations, when funding is available. Long-term institutional (federal) support will be necessary for hosting and tech support for the coding. However, the fact that it is open source should ensure some longevity.

In order to accommodate for the fact that not all users are literate in the standard orthography of their language, it was imperative that the platform have a multimedia approach to data (see Figure 2). At the core of the platform is the ability to host and manage massive amounts of media. Users can upload media in audio, picture, and video formats. As web technology advances, we are leveraging new audio and image capture techniques in order to allow users to directly record audio and create images on their devices and to upload them to the site without relying on their devices' permanent storage. We envision scenarios where a contributor can record new terminology in their dialect and upload it to the platform without specialized audio recording equipment, software, or training. However, it is important to balance this capability with the need for high quality multimedia. This gives users the experience of being able to access carefully curated, high fidelity multimedia content produced by professional audio, graphic, and video artists/recorders, editors, and curators, as well as multimedia content made by 'do-it-yourself' users.

2.2 DATA DISSEMINATION AND MULTI-FORMATS. We decided that it was important for us to be able to disseminate the information in our database in a variety of formats in order to make the information easily accessible to as many people as possible. We therefore needed to design the platform in a way that would make it easy for us to display the information in a website or export it to create books, mobile apps, posters, and other print materials. We export the data through a custom-made script in the web application (PHP), which then converts the data into XML (eXtensible Markup Language, WordML) format for books and JSON (Java Script Object Notation) format for apps.

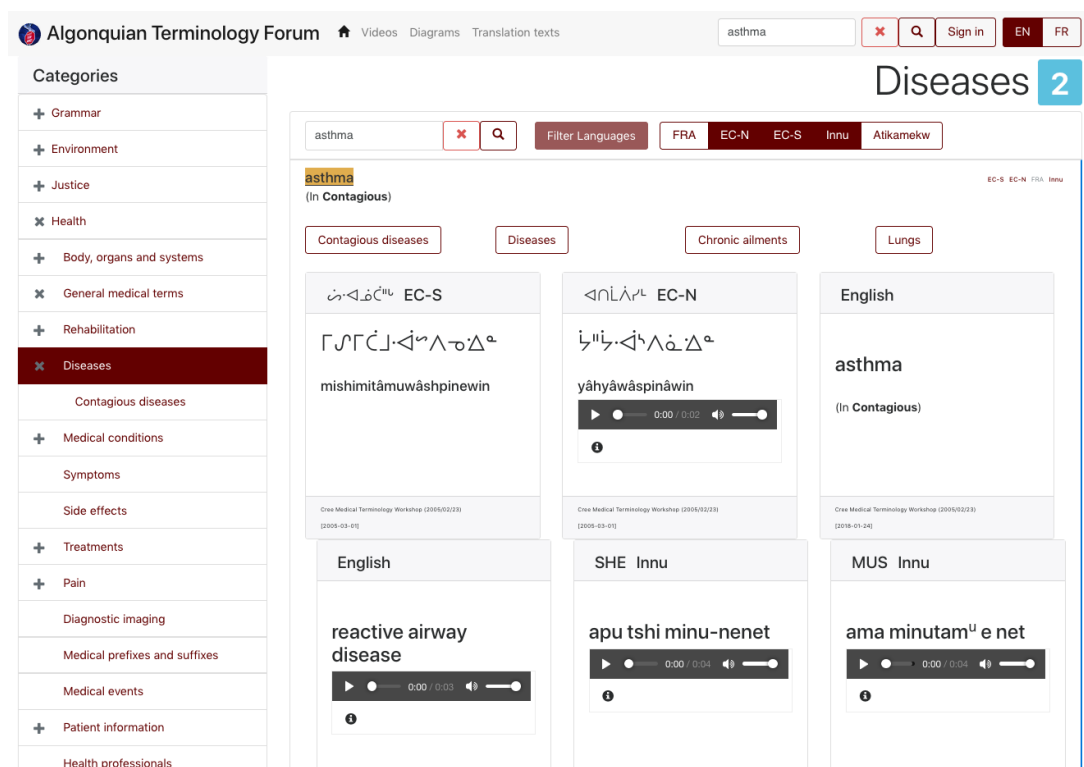


FIGURE 2. Terminology Forum entry with audio - terminology.atlas-ling.ca

3. INNU TERMINOLOGY DEVELOPMENT IN THE LEGAL CONTEXT. We now turn to the data itself, examining two projects/languages that have contributed to the development of the Forum and made extensive use of this tool. Creating new terminology in domains where language is growing and changing is an important part of language revitalization. Even when we speak a second language fluently, we still feel more comfortable communicating with our doctor or lawyer in our mother tongue. As for cancer patients navigating their journey through the health system, which we will discuss in Section 4, it is important for any individual who comes in contact with the court system to feel comfortable and to have a clear understanding of their situation. For this to occur, it is crucial that legal translators and interpreters have a strong grasp of the terminology they are interpreting.

For years, however, Innu translators and interpreters in Labrador's justice system were being given no training in legal terminology or translation/interpretation practices. While they were fluent speakers of Innu, they were being put in a position where they were being asked to translate technical terminology they did not understand. It is not difficult to imagine the extremely serious consequences this type of breakdown in communication may create. In Ontario, poor interpretation has been a cause for mistrials and has even been alleged to be responsible for wrongful convictions.¹⁰ We do not know whether incorrect verdicts may have resulted from poorly trained interpreters in Labrador as well.

¹⁰ See for example Joseph Brean's article in the *National Post* in 2011 "Translation derails sex assault trial": <https://nationalpost.com/news/canada/translation-derails-sex-assault-trial> (Date accessed: January 10, 2020).

3.1 TERMINOLOGY DEVELOPMENT AS TRAINING. To address the problem of untrained translators and interpreters, the Newfoundland and Labrador Department of Justice provided funding in 2007 for the *Innu Language Project* to run workshops with Innu interpreters and non-Innu legal experts to create glossaries of Innu legal terminology for Labrador interpreters. Three workshops were held in 2007 to develop terminology for criminal law, followed by two workshops in 2008 for family law terminology. This project thus took place before the creation of the *Online Terminology Forum* but later informed its development.

The first step was to create easy-to-understand explanations of the terms in English. Secondly, interpreters, linguists, and legal experts collaborated to create clear equivalents in Innu. It is important to note that the Innu equivalents of legal terms are more often translations of English explanations rather than direct translations of the terms themselves. This is significant because, for translators and interpreters with limited training in terminology, access to clear and descriptive explanations or definitions plays an important role in translator and interpreter training. While there is rarely only one correct way to create an equivalent translation of a term, it is always important to ensure translations are accurate, easy to understand, and suitable for the target audience. This is the type of direction that linguists and experts were able to offer in the collaborative process, alongside Innu translators.

The process of developing the English definitions for each technical term was valuable training for the interpreters. In fact, we found that the process of creating the terminology was as important as the resulting glossaries. In many cases, due to a lack of previous training, the interpreters did not understand the English terms and it was extremely helpful for them to be able to ask experts in the legal field for clear explanations and answers to their questions.

3.2 DIALECTAL VARIATION. The two Labrador dialects of Innu have considerable differences in both vocabulary and grammatical structure and, for the Mushuau Innu in particular, it was important to have a separate glossary for each dialect. Despite these differences, it was helpful for speakers from both dialects to work collaboratively during the workshops. Similarities in their dialects allowed the translators to share ideas and to work together towards deciding on final translations for each term. In some cases, the agreed upon translations were similar or even identical for both Mushuau and Sheshatshiu terms; in others, they were quite different.

We decided to use the format of a double-sided “flip book”, with both glossaries appearing back to back in a single book. We felt it was important that neither dialect be given prominence over the other and that interpreters have access to translations in both dialects. Because the communities are so small and there is such a limited pool of Innu interpreters, it is inevitable that an interpreter will at some point be called on to interpret for a speaker of the other dialect. In addition to the legal glossaries, the *Innu Language Project* created glossaries in both Labrador dialects for the fields of health, environment, and education (MacKenzie & O’Keefe 2007, 2009; MacKenzie 2010, MacKenzie & Hendriks 2009).

4. EAST CREE TERMINOLOGY DEVELOPMENT IN THE MEDICAL CONTEXT. We now turn to an example of terminology development in the medical context. Three or four years ago, there was a lack of vocabulary in the Eastern James Bay Cree dialects to talk about specialized medical treatment such as cancer care. The *Cree Board of Health and Social Services of James Bay (Cree Health Board)* has the mandate to

provide health care services in the East Cree language and, because the fluency rate is very high, this is a priority.

The *Cree Health Board* approached the *Algonquian Dictionaries Project* (east-cree.org) team to help develop cancer-specific vocabulary. Iiyiyiu (East Cree) medical terminology, in this case for cancer treatment, had to be created for both dialects (Northern and Southern) of the language. The *Online Terminology Forum* has been an essential tool for the process of creating the East Cree medical terms and has been used both to create and house this glossary, which can be consulted by Iiyiyiu interpreters and health care providers when interpreting for patients in their own language.

4.1 LANGUAGE FOR HEALING. Language plays an important role in healing and health (Chandler & Lalonde 1998; Kirmayer et al. 2000; Oster et al. 2014). When people are feeling very ill, hearing their own language can bring great comfort and a sense of security. It is also an issue of safety when a patient is unable to communicate with caregivers. With this in mind, a working group was set up to hold terminology workshops with two groups: Northern dialect speakers and Southern dialect speakers. Both groups consisted of speakers with different experiences and professional backgrounds. Each group included speakers who had experience in medical interpretation or who worked with interpreters, such as community health representatives and Cree nurses. We also held consultation sessions with medical doctors to help provide valuable insight into the English terms and definitions. Once the initial terms were created, linguists and language specialists who knew the standardized orthography and syllabics were able to transcribe the terminology produced during the workshops.

4.2 DIALECTAL VARIATION. Over the course of the workshops, which were held between 2014 and 2017, we found that the two groups of speakers worked very well together. Some knew each other already and were often able to feed off of and inspire one another in the creation of neologisms for their individual dialects. For example, similar new terms were created for the Northern (4a) and Southern (4b) dialects for ‘medical history.’

(4) East Cree neologisms for ‘medical history’¹¹

(a) EC-Southern:

pechi	utâhch	awen	utatâspinewinh
pechi	utâhch	awen	u-tatâspine-win-h
to.here in.the.past		someone	his/her-certain.illness-NOM-PL
a person’s past illnesses ‘medical history’			

(b) EC-Northern:

pâchi	utâhch	itâspinâusinihîkin
pâchi	utâhch	itâspinâu-sinihîkin
to.here in.the.past		s/he.has.a.certain.illness-book
past illness file ‘medical history’		

¹¹ Abbreviations: EC ‘East Cree’, NOM ‘nominalizer’, PL ‘plural’

In some cases, however, it was a challenge to remember to respect each other's dialects, not only in terms of orthography but in terms of how certain concepts might be expressed differently. Some neologisms suited one dialect but just did not work for the other. An example of this type of difference was with the terms for 'vaccine therapy', shown in (5). The word *chîshtihwâu* means 'to prick someone' and is related to the grammatically inanimate form *chîshtahâm* 'to prick something' or 'to roast meat on a stick'. The inanimate form does not specifically refer to roasting, but to the preparatory step of piercing meat (an inanimate noun) with a stick in order to set it by the fire to roast. Nevertheless, Southern speakers associated the use of the inanimate term (for the whole procedure of piercing meat on a stick and then roasting it) with the animate one, which can refer to pricking or piercing a person, and were unwilling to use the latter to refer to a medical procedure. Instead, Southern speakers preferred to use a lengthy explanation. For Northern speakers, in addition to the meaning 'to prick someone', there was already an established use of the term *chîshtihwâu* to also refer to the medical procedure of giving a needle/vaccine.¹²

(5) East Cree expressions for 'vaccine therapy'

(a) EC-Southern:

<i>pachiskâhîkanâpûh</i>	<i>e</i>	<i>wîchihîkuyan</i>	<i>ekâ</i>	<i>che chî</i>	<i>âhkusiyan</i>
<i>pachiskâhîkan-âpûh</i>	<i>e</i>	<i>wîchihîkuyan</i>	<i>ekâ</i>	<i>che chî</i>	<i>âhkusiyan</i>
needle-liquid	that	helps	to.not	become	you.be.sick
injection medicine that can help to prevent you from getting sick					
'vaccine therapy'					

(b) EC-Northern:

<i>chîshtihwâu</i>	<i>wîchihîkusîwin</i>
<i>chîshtihwâu</i>	<i>wîchihîkusî-win</i>
s/he.pokes.him/her	it.helps-NOM
injection therapy	
'vaccine therapy'	

4.3 MULTIPLE SUBMISSIONS. For the purposes of the *Online Terminology Forum*, we decided that having more than one proposition for a particular term was more of a benefit than an encumbrance for a number of reasons:

1. The creation of more than one term or expression allows for different ways of explaining a particular concept to a speaker.
2. The main goal of terminology development (in this case, cancer vocabulary) is to help interpreters express and explain medical procedures; this way, an interpreter will have various options for explaining to a Cree patient what the doctors or specialists are saying.

¹² As a note of interest, in Innu there are two separate meanings for *tshishtaueu*: 's/he cooks it (anim) over the fire stuck on a stick' and 's/he gives him/her an injection, a vaccine or s/he takes blood from him/her'.

3. Allowing multiple submissions encourages creativity in neologisms; when coming up with a new term in any language there is trial and error, where a mutually agreed upon translation results only after many suggestions, collaboration, and the passage of time.

Currently, multiple submissions are not a problem for the *Forum* because there are rarely more than five neologisms per English or French equivalent. However, as people get more engaged with the *Forum* and as additional languages and dialects are included, it is possible that we will have to revisit this in the future if we find that the number of submissions becomes unmanageable.

4.4 LANGUAGE CHANGE. Because language changes over time, younger and older speakers may not use—or sometimes even understand—the same vocabulary. For this reason, we also took into consideration the level of speaker comprehension when creating new terms. It was important, for example, to always keep in mind whether the terminology proposed would be understood by speakers of all ages and to ask ourselves questions such as: Will an elder (over 60 years of age) understand? Will a 20-year-old understand? For example, two speakers of the Northern dialect of East Cree offered the following two expressions for ‘swollen veins,’ shown in (6). The first term illustrates the traditional polysynthetic approach of older speakers to use incorporated morphemes. The second expression illustrates a separate-word, English/French-driven approach, which younger, bilingual speakers are more likely to use.

(6) ‘Swollen veins’: *pâchimihkwâyâpîwâpiyiu* vs. *â pâchipyit umihkwâyâpîh*

pâchimihkwâyâpîwâpiyiu (incorporated morpheme)
 pâchi-mihkw-âyâpî-wâpiyiu
 swollen-blood-vessel-become
 ‘his/her veins are swelling, are swollen’

<i>â</i>	<i>pâchipyit</i>	<i>umihkwâyâpîh</i>
<i>â</i>	<i>pâchi-piyit</i>	<i>u-mihkw-âyâpîh</i>
when	swollen-become	her/his-blood-vessel
‘when his/her veins become swollen’		

4.5 PROVIDING CONTEXT WITH VIDEOS. In addition to creating terms for cancer care, it is also very important to provide context. In Eastern James Bay communities, as in many Indigenous communities across Canada, the health care structure process for specialized care requires that patients be flown south to cities with major hospitals. This means that patients are often far away from their loved ones while they receive care. For these reasons, we decided to create videos to illustrate the journey of a Cree cancer patient. The videos show a patient interacting with a health care professional discussing topics including exam results, further testing, procedures, and much more. These videos serve as crucial training for Cree health care workers and interpreters¹³ and also help patients prepare for their cancer care journey.

¹³ Interpreters usually have no formal training, but some have a wealth of experience in having accompanied patients over the years. For our cancer project, we selected reputable people, using an appreciative

LANGUAGE DOCUMENTATION AND CONSERVATION

5. TERMINOLOGY FORUM IN ACTION. In February and May of 2018, we were invited by the *Institut Tshakapesh*, an organisation devoted to the preservation of Innu language and culture in Quebec, to hold two workshops in the Innu community of Uashat with teachers and interpreters from Innu communities across the province. These workshops marked the first opportunity we had to show speakers (besides those who had been involved in its development) how to use the *Forum*. The main goal of the workshops was to offer speakers training in how to use the interface itself. This included instruction on how to add new terms and explanations as well as how to upload sound files and images. Most importantly, we wanted speakers to feel comfortable using the interface to search, add, or suggest changes to existing terms on an ongoing basis, after the workshops.

The workshops also offered an excellent opportunity for us to elicit feedback from participants about their user experience as they worked with the interface for the first time. Based on this feedback, in the three months between the workshops, we were able to make substantial improvements to the interface. We fixed the bugs identified and improved aspects of the interface design that users found challenging. For example, during the first workshop it became apparent that it was too complicated for users to make their own recordings, edit them, and upload them to the website. While they could easily make recordings on their smartphones, there was no easy way to upload the recordings to the website in an appropriate (open source) sound format. Since we knew how important it was for speakers to be able to contribute audio recordings easily, we added a feature to the web interface of the *Forum* where a recording could be made directly in the user's browser and attached to an entry. Finally, based on users' experiences with the interface, we created a list of steps for users to follow when adding or editing terms and translations.

Over the course of the workshops, we were able to make numerous additions and improvements to the database. As a group, we reviewed existing terms and added new ones. Before the first workshop, we asked translators what terminology they were interested in creating. They had an interest in legal terminology, as some of the translators were currently working on neologisms in this field. Since we already had a wealth of legal translations for the Labrador dialects of Innu in the *Forum*, this gave us the perfect opportunity to review some of these together. In some cases, the group decided that the Labrador translations worked for their dialects too, or that it could be adapted for their dialects with a bit of tweaking. In other cases, the group didn't like the existing translations and suggested completely new ones for their own dialects. The group also identified a number of mistakes in the earlier translations. Since the *Forum* is a work in progress, it allows for this type of collaboration and feedback directly in the interface itself.

5.1 TALKING ABOUT TECHNOLOGY IN INNU. Prior to the first workshop, we asked participants to pick a new domain, an area in which they felt that Innu vocabulary was lacking. The teachers expressed to us how important it is for them to be able to talk with their children and students about new technology in their own language. While domains like health and justice often get funding for terminology development, there is rarely funding for domains like technology, so another benefit of the *Forum* is that it allows translators to have greater control over the types of new vocabulary they create.

enquiry perspective to focus on what works, and model best existing practices (Cooperrider & Whitney 2001).

The following list includes an example of some of the neologisms created in the field of technology over the course of the workshop. The terms are in French, English, and Innu because the Innu from Quebec speak French as their second language, while the Innu from Labrador speak English as their second language. In order to collaborate with the Innu from both provinces, it is necessary for us to work in both languages and to provide terms in both French and English as often as possible.

(7) Innu terms suggested or created for technology (elicited from French)

réseaux sociaux / social networks

petatshimuna (pl.)

petatshimun (sg.)

Noun made from the verb *petashimu* ‘s/he bring.news’

téléphone cellulaire (un) / cell phone

kaiminanut ka pami-takunakanit

conversation that walk.around-hold.in.hand

brancher (se) sur l’internet / connect to the internet

tapishinu

fit.into.another

chargeur / charger

ishkuteu-miutiss

fire-little.box

carte mémoire / memory card

tshissiupaniu-kanu

remember (‘to have a fact come to mind’)-card

5.2 PROVIDING TRANSLATED TEXTS FOR CONTEXT. We are currently in the process of adding existing, high quality translated texts to the *Forum*. These texts, originally written in French or English and translated into the various Algonquian languages, show how a particular term can be used in various contexts. Our goal is to include as many model multilingual texts from as many domains as possible as they become available. For each text, equivalent paragraphs are displayed side by side and words or expressions can be searched in either language (see Fig. 3). For example, we currently have a text in French and Innu that gives information on cigarettes and smoking. A word like *dépendance* (addiction) can be searched and all paragraphs containing the term are displayed next to their corresponding Innu version. Similarly, the Innu texts can be searched to verify the contexts in which a particular Innu term is used. Skilled translators requested to be identified, and users agreed that knowing the translator would help them choose the best model, given differences in context, translator age and style, dialect, and so on. Our hope is that providing context for terms will be helpful to translators and interpreters, who can consult how a particular term has been expressed or used in various contexts and choose which one best suits their current needs. The texts will also allow us to track future terminology development and model how creative people can be in their translations.

Traduction	Texte	Langue	Source
Ka takushiniht Tshishe-mishtikushuat ute, ne tshishtemau shash ait itapshikiapanan. Anitshtenat tshashinnuat tshishpanipanan e pituauatsheht kie shash matenitamupanan eka shuk* menuinniut, eka menushiniti. Peikuan tshissenimakui ne tshishtemau eka katshi puniakani mak mitshet auenitshenat nepaikuht nenua tshishtemau, 57 % itashuat innuat patuauht eshakumitshishikua kie ma nanikutini. Mishta-mitshet an.	À l'arrivée des Européens, le tabac est devenu un produit de consommation. Nos ancêtres commencèrent donc à le fumer et à ressentir peu à peu ses effets nocifs sur leur santé. Même si nous savons tous que la cigarette entraîne une dépendance des plus puissantes et qu'elle tue chaque année des milliers de personnes, 57 % des adultes des Premières Nations fument quotidiennement ou occasionnellement. C'est énorme	Innu	Uauitshitun - Tshishtemau, vol. 1, no. 1 Translated by: Yvette Mollen
Aimun e patshitinakanit tshishtemau e uauinakanit	Bulletin d'information sur le tabac		
Uitshiakanuat innuat ka animuht, ka kutunnuepipuneshiht ashu nishuaush kie ushte ka animinikuht tshekuannu (kamatshikaut, ka kutshipanitaht tshetshi shaputueht auennua katshi uniataui, eka katshi punitaht tshekuannu ka animinikuht, ka mashinapeueht kie ma ka mashishkueueht, ka animuht utinniunuat) kie ma auen ka mataunakuannit tshekuannu ka apashtat.	Aide aux personnes âgées de 18 ans et plus présentant différentes problématiques (toxicomanie, deuil, dépendance , violence conjugale, situation de crise...) ou ayant des besoins spéciaux.	Innu	Uauitshitun utaimun - automne 2013 Translated by: Yvette Mollen
Uauitshitun utaimun - automne 2013	Uauitshitun utaimun - automne 2013		
Uitshiakanuat auenitshenat ka animinikuht kamatschikauit kie ma eka katshi punitaht tshekuannu.	Aide aux personnes aux prises avec des problèmes de toxicomanie ou de dépendance .	Innu	Uauitshitun utaimun - automne 2013 Translated by: Yvette Mollen
Uauitshitun utaimun - automne 2013	Uauitshitun utaimun - automne 2013		

FIGURE 3: Parallel translated texts - terminology.atlas-ling.ca

5.3 WORKSHOP OUTCOMES. During the workshops, new Innu terms for the Quebec dialects in the fields of technology, justice, environment, and health were created and added to the database. Participants received training in the methods of terminology development and translation, as well as in how to use the *Online Terminology Forum*. We also provided some training in various methods of audio recording and in the importance of the use of texts for context in word creation and translation. Finally, the workshops gave us valuable information on how to improve the interface and engendered a renewed excitement about the *Terminology Forum* and the role we hope it will play in language (re)vitalization not only for Innu and Cree, but for other Algonquian languages, as well.

The Atikamekw, hearing about the Innu workshop, recently expressed interest in having their language included in the *Forum* as well. We have charged one of our students with the task of adding some existing Atikamekw legal vocabulary¹⁴ they provided us, before we begin offering a workshop for this language. The *Institut Tshakapesh* is interested in holding further workshops so that more Innu speakers can receive training and keep momentum going with terminology development in their dialects.

6. CONCLUSIONS. We have shown that a collaborative approach to multi-format terminology development is an effective, realistic, and constructive way to support and maintain Indigenous languages that are not yet severely endangered. Time will tell if the technology and methods we have developed will have a real impact in sustaining East Cree, Innu, and other Indigenous languages well into the future, especially if the pressure of the dominant official language keeps increasing. The domains in which Indigenous languages will be spoken and used in the future depends, in part, on the avail-

¹⁴ From the *Lexique Juridique Atikamekw*, 2008.

ability of tools to support speakers in creating and disseminating new words and expressions. It also depends on the availability of communication technologies for the language to strive with new cultural practices.

Current and future work include developing communication protocols (Application Programming Interfaces) between our online dictionaries and the *Terminology Forum* to allow extended searches from the dictionary of a particular language to the *Forum* and vice versa, as well as increasing the database of translated texts and interpretation videos. We are also planning capacity building efforts that will allow for workshop facilitation and *Forum* training by Indigenous speakers. The method and technology described here are applicable to any minority language with a significant number of speakers, although the implementation details would have to be sensitive to the particular language ecology.

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